# C. U. Shah University
# B.Tech (IC)

**Branch: Instrumentation & Control**                    **Semester-IV**
**Subject Code: 4TE04EIM1**
**Subject Name: Electronics Instrumentation & Measurement Techniques**

**Instructions:**

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

## SECTION-I

| | | |
|---|---|---|
| **Q.1** | Explain with neat sketch construction and working of Galvanometer, also derive torque equation for steady state deflection. | **(7)** |
| **Q.2 (a)** | Explain Working of Megger with neat sketch | **(5)** |
| **(b)** | Explain Voltmeter Multipliers with neat sketch. | **(5)** |
| **(c)** | A moving coil instrument gives a full scale deflection of 10mA when potential difference across it terminals is 100mV. Calculate (a) Shunt resistance for full scale deflection corresponding to 100A. (b) Series resistance for full scale reading with 1000V. Calculate power dissipation in each. | **(4)** |

**OR**

| | | |
|---|---|---|
| **Q.2 (a)** | Explain multi range volt-meter with neat sketch. | **(5)** |
| **(b)** | A moving coil ammeter has a fixed shunt of 0.02Ω. With a coil resistance of R=1000Ω and a potential difference of 500mV across it, full scale deflection is obtained: (a) To what shunted current does it correspond? (b)Calculate the value of R to give full scale deflection when shunted current is (*i*) 10 A (*ii*) 75 A. (c) With what value of R is 40% deflection with I=100A. | **(5)** |
| **(c)** | List advantages and disadvantages of PMMC Instruments. | **(4)** |
| **Q.3 (a)** | Explain with neat sketch construction and working of Whetstone's bridge. | **(5)** |
| **(b)** | Derive Equation for balanced Maxwell's Bridge. | **(5)** |
| **(c)** | Write down Limitations of Wheat-stone Bridge. | **(4)** |

**OR**

| | | |
|---|---|---|
| **Q.3 (a)** | Draw and Explain Working of Kelvin double bridge. | **(5)** |
| **(b)** | What is Wagner connection? Explain with neat sketch. | **(5)** |
| **(c)** | Explain Working of LCD display. | **(4)** |

## SECTION-II

**Q.4 (a)** Mention essential requirement for construction of shunts **(3)**

**(b)** Mention essential requirement for Construction of multipliers **(3)**

**(c)** Explain Effect of Temperature Change in Voltmeters **(1)**

**Q.5 (a)** Explain with neat sketch, Construction of CRT. Mention all the important components of CRT. **(5)**

**(b)** Draw and explain working of Segmental displays. **(5)**

**(c)** Draw and Explain block diagram of Function generator. **(4)**

**OR**

**Q.5 (a)** Draw and explain block diagram of CRO. **(5)**

**(b)** Explain significance of Horizontal and Vertical Deflecting plates in CRO **(5)**

**(c)** Explain working of sweep frequency generator. **(4)**

**Q.6 (a)** Compute the total harmonic distortion of a signal that contains a fundamental signal with an rms value of 10 V, a second harmonic with an rms value of 3 V, a third harmonic with an rms value of 1.5 V, and a fourth harmonic with an rms value of 0.6 V. **(5)**

**(b)** Explain Heterodyne type wave analyzers. **(5)**

**(c)** Explain what is distortion analyzer. **(4)**

**OR**

**Q.6 (a)** Draw and Explain working of Spectrum analyzers. **(5)**

**(b)** A wave analyzer has a fixed bandwidth of 4 Hz, By what percentage can a 60 Hz signal change without disrupting measurement of the fourth harmonic with the instrument? **(5)**

**(c)** Write down principal applications of wave analyzers. **(4)**